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Sewerage & Water Board of New Orleans

Emergency Program Management and Staff Augmentation of Operations, Maintenance and Recovery

EXHIBIT
A

August 18, 2017

Mr. Bruce H. Adams, P.E.
Deputy Director of Engineering and Construction
Deputy General Superintendent
Sewerage and Water Board on New Orleans
8800 S. Claiborne Avenue
New Orleans, Louisiana 70118

Subject: Emergency Program Management and Staff Augmentation of Operations, Maintenance and Recovery in support of the Sewerage and Water Board of New Orleans

Dear Mr. Adams:

CH2M is pleased to provide this proposal to the Sewerage and Water Board of New Orleans (SWBNO) for the above-referenced work to support SWBNO efforts to address current emergency operations with drainage pumps, power production, emergency generators and any other as-needed services per SWBNO direction. Some specific services anticipated to be provided are outlined below. Additional services will be added per SWBNO direction and scope added through contract amendment. As a part of our assistance and to keep the SWBNO fully apprised of CH2M activities, our team will be in daily communications with SWBNO leadership and will provide a brief summary of all activities, including regular reporting. In addition, electronic compilation of regular communications will be provided monthly in conjunction with invoicing.

Attachment 1 includes an estimate of staff to deliver the following scope of work. CH2M will obtain approval from Mr. Adams for all staff and resources prior to using them on the Program.

Scope of Work

Task 1: Program Management and Support

CH2M will provide integrated support for the SWBNO's power and pumps drainage system including the emergency operations, maintenance and recovery activities. Program management and support services are intended to provide a framework of operations, financial accountability, administration, and strategic planning.

Sub-task 1.1 – Program Management/Administration Support Services – CH2M will provide project management and administrative support services. Anticipated services include:

Project Management – CH2M will provide project management and planning services to support the SWBNO staff address specifically project identification, scoping, conceptualization, and delivery. Additionally, CH2M will assist in preparation of draft procurement documents, technical analysis and design support for specific project development, and construction contract project management. Identification of necessary SWBNO staff action items in support of the CH2M program and project management activities.

Strategic Communications – CH2M will provide strategic communication support services to the SWBNO related to the emergency drainage pump and backup generator recovery operations and other items as

needed and requested. Anticipated services include the development and distribution of operational status reports and responding to information requests from the SWBNO. Anticipated services may include the development of basic spreadsheet and/or database tools as information repositories necessary to facilitate more efficient information distribution internally and externally of the SWBNO.

Subtask 1.2 - Program Controls – A CH2M Program Controls Manager will develop and implement a framework to provide transparent insight regarding cost, schedule, and procurement services. The CH2M Program Controls manager will work collaboratively with the SWBNO Project Delivery Unit (PDU) to integrate the available staff into Emergency Program tasks, and assists the PDU to introduce more formalized and structured control processes. Elements of the Program Controls system are anticipated to include:

Master Schedule – CH2M will develop a master schedule that integrates on-going emergency operations activities. The master schedule will be updated weekly and distributed to designated individuals in a format generally accessible to team members.

Cost Estimating – CH2M will provide construction cost estimators to receive and review cost proposals from general contractors related to emergency operations repairs to facilitate the procurement process. Cost estimators will provide feedback to the SWBNO for the quoted work. SWBNO will maintain decision authority to accepting or declining the contractor cost proposal.

Document Control and Contract Management system – CH2M will utilize internal CH2M systems to provide Program document control and contract management system, maintaining records gathered during the interim emergency period on behalf of the SWBNO. All documents will be transferred to SWBNO and the close-out of the contract period.

Procurement Support – CH2M will provide procurement specialist(s) to work within the SWBNO organization to support procurement services for the emergency operation. The procurement specialist(s) will work under the direction of SWBNO staff, but will not have signature authority to contractually commit the SWBNO. These support staff will provide scopes of work and other information to expedite SWBNO procurement. CH2M will not perform procurement on behalf of SWBNO.

Sub-task 1.3 - Engineering Support Services – Engineering and Technical Support Services will be provided to the SWBNO. These services are anticipated to include: project management, mechanical engineering, electrical engineering, structural engineering, civil engineering, engineering design services, and any other needed technical services. CH2M resources are anticipated to engage with the SWBNO at their request to assist in technical issues resolution and quality reviews.

Sub-task 1.4: Asset Management Oversight and Strategic Consulting – CH2M will work in coordination with Veolia, SWBNO's third party contractor, collecting asset management information related to drainage assets. CH2M services are also anticipated to include strategic consulting service related Smart Cities technology, maintenance management systems, and other technology platforms to improve operational efficiency of the SWBNO.

Sub-task 1.5: Staff Augmentation – CH2M will identify resources within CH2M or through other resources to provide any requested staff augmentation for short or potentially long-term roles as needed. Potential staff may include operators, electricians, mechanics, additional craft labor, and other staff.

Task 2: Pump Task Force

A Pump Task Force has been established to drive the collection of pump station condition and operational readiness inspections, and prioritize and expedite repairs. The collection of the information will be used in conjunction with a predictive stormwater hydraulic model. The hydraulic model will be used to provide the

SWBNO with information to make decisions on prioritization of drainage assets and benefit cost analysis of maintenance expenditures.

Sub-task 2.1: Pump Inspections – Site visits will be performed at each stormwater drainage pump station undergoing maintenance by contractors per the SWBNO. Inspection Teams will document the activities of the contractors and report progress on the contractor activities.

Sub-task 2.2: Interactive System Reliability Modeling – Using existing hydraulic model(s) provided by SWBNO, incorporating drainage system asset availability, an interactive stormwater model will be developed, as the basis of a risk assessment tool of system functionality, and as a predictive tool to prioritize future maintenance and system hardening. The reliability of the Interactive Model will be limited by the quality and extent of information supplied by the SWBNO.

Task 3: Power Generation Task Force

A Power Generation Task Force has been established to provide emergency operation support services at the direction of the SWBNO.

Sub-task 3.1: Emergency Power Generation Implementation – At the direction of the SWBNO, the team will assist with implementing emergency power generation through the following activities:

1. Assist the SWBNO staff with the identification of generator locations, capacity, and coordination with Entergy, SWBNO Operations, USACE, and other key stakeholders.
2. Coordinating logistics at the direction of SWBNO with generator rental companies (ARCCO and United Rentals, and others to be identified) on procurement and installation.
3. Provide generator inspection services at the direction of the SWBNO.

Sub-task 3.2: Emergency Power Generation Demobilization: CH2M will provide generator demobilization logistics assistance at the direction of the SWBNO when it is determined that generators are no longer required.

Task 4. Asset Management and SCADA Assistance (Option)

Sub-task 4.1: Asset Management Platform Integration - CH2M will coordinate with SWBNO GIS teams to create a short-term repository for asset information to facilitate collection of drainage system asset data. CH2M will identify the new fields and associated formats required to collect and store pertinent information, for which SWBNO a staff will be required to configure hand-held field devices. Licensing and hardware will not be provided by CH2M. This activity will be the foundation of a more formal asset management system which will allow SWBNO to have a more reliable system and maximize the useful life of the equipment.

As a part of this task, CH2M will develop the criteria for the SWBNO to procure long term computerized data asset management software. CH2M will perform a functional needs assessment to evaluate future functionalities, provide a short-list of software to meet those requirements, and develop a procurement specification for use by SWBNO. Additional services could include facilitating vendor demonstrations and evaluation of proposals.

Sub-task 4.2 SCADA Implementation Assessment - CH2M will perform an evaluation of a proactive approach to monitoring of stormwater operations, and provide recommendations monitoring requirements critical to operations and system reliability. This task may involve pilot application of SCADA monitoring points at critical locations in the system. CH2M will not procure SCADA related hardware or software per this task.

Assumption

This scope of work is limited to consulting services, no direct supervision of SWBNO employees or contractors will occur. Additionally, no direct maintenance activities will be performed without the prior coordination with and under the direction of SWBNO. CH2M is not responsible for the operation of the facilities and will not be responsible for any violations or compliance issues that the facilities experience.

Schedule

Given the urgency and emergency nature of this work, CH2M will begin work on August 10, 2017 and continue to perform until November 30, 2017, the not to exceed cost is reached, SWBNO and CH2M reach an agreement to discontinue services, or the contract is otherwise amended. Attachment 2 Identifies the preliminary Major Task schedule of activities and deliverables.

Compensation

Compensation will be based on a raw labor rates for CH2M and affiliated staff times a 3.20 multiplier plus subcontractors, outside services, software, materials and equipment with a 10% mark-up with a not-to-exceed amount of $3,000,000. No other direct expenses including travel related expenses shall be subject to reimbursement by the SWBNO unless approved in writing. The total not-to-exceed amount is based on the funding budgeted by the SWBNO. It is anticipated the activities described herein will exceed the amount of funding. As the project proceeds and the scope is better defined, all parties agree to evaluate and amend as appropriate.

Recognizing that CH2M may perform work for SWBNO with some shared staff on other separate projects, CH2M's time keeping policy will ensure that accurate time recording and subsequent invoicing will be applied to all projects. Additionally, tasks performed can be noted for each day that hours are recorded.

CH2M appreciates the opportunity to be of service to the SWBNO. Please do not hesitate to contact Carlos Giron at (225) 572-9639 if you have any questions or require additional information.

Sincerely,

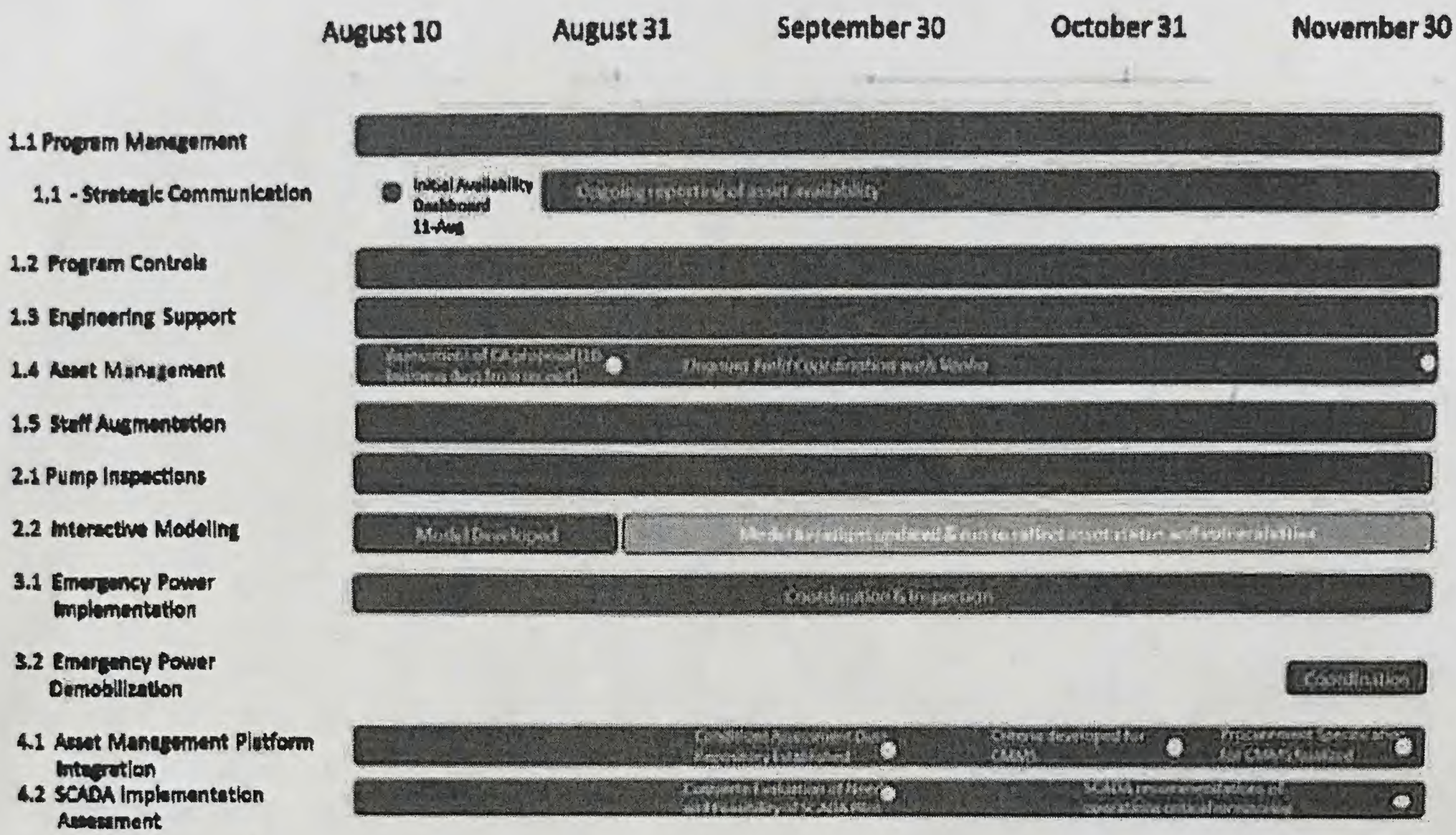
CH2M

Carlos Giron, P.G.
Vice President

Attachment 1: Program Team Estimated Level of Effort

Program Leadership	3 FTE
Senior Project Manager(s)	2 FTE
-Mechanical Engineer(s)	2 FTE
-Electrical Engineer(s)	2 FTE
-Power Engineer	1 FTE
Project Engineer	2 FTE
-Integrated Modeling (Stormwater + Asset)	2 FTE
-Administrative Assistants	2 FTE
-Document Controls	2 FTE
Program Controls Lead	1 FTE
-Master Scheduler	1 FTE
-Scheduler(s)	2 FTE
Financial Cost Analyst	1 FTE
-Independent Cost Estimator(s)	2 FTE
-Procurement Staff Augmentation	1 FTE
Asset Management Lead	0.5 FTE
-Asset Management Specialist	0.5 FTE
-SCADA Specialist	1 FTE
Communications Lead	1 FTE
-Communications Specialist	1 FTE
Inspection Lead	1 FTE
-Inspector(s)	3 FTE
Lead Operator	1 FTE
-Operator(s)	8 FTE
Health & Safety	0.1 FTE

Attachment 2: Schedule of Major Task Activities and Deliverables



1.5 Engineer Support (Task 03.01.13 CLOSED – remaining costs to be transferred to EMD budget)

A task for Engineer Support was included in the original contract. Currently, it is understood that these specific support needs are no longer required; therefore, no further scope or fee is included for this task.

1.6 Asset Management Oversight and Strategic Consulting (Task 03.01.14)

Early meetings were held with SWBNO GIS, SWBNO Information Technology (IT), and SWBNO Operations personnel to understand/access available drainage-related information from those departments, including the supervisory control and data acquisition (SCADA) system. CH2M collaborated with Veolia regarding asset management data collection, asset hierarchy development, and conditions assessment. Senior technical personnel attended meetings with the SWBNO, City, and Veolia personnel to advise on a short-term strategy for collection, quality control, and processing of asset information, and consistency in transferring asset information provided to the SWBNO.

CH2M will continue to work in coordination with Veolia to collect drainage asset inventory and condition information, as well as provide strategic consulting service related to maintenance management systems and other technology platforms to improve operational efficiency of the SWBNO. Specific scope items included in this task follow:

1. **Develop and implement a prioritization/decision-support framework for additional Critical Corrective Repairs and Stabilization repairs of drainage pumps and associated infrastructure**
2. **Conduct a failure modes and effects analysis (FM-EA) for DPS 12**
3. **Continue compilation and transmittal of asset condition data to support capital budget planning and other strategic planning initiatives for SWBNO**

1.7 Staff Augmentation (Task 03.01.15 PAUSED)

Collaboration with the SWBNO and City's Geographic Information System (GIS) teams has been ongoing under the original contract in support of developing GIS dashboards, leveraging existing SWBNO and City tools to increase communication and data availability.

A task for staff augmentation was included in the original contract, which included the activities described in this section. Currently, it is understood that these specific staff augmentation needs are no longer required; therefore, no further scope is included for this task. The requested additional funds for this task are to recover costs above the initial contract amount.

1.7.1 Initial Mobilization of Staff, Data, and Information Discovery (Completed)

In response to the critical nature of the emergency, CH2M mobilized a team from across the country to supplement the core team in Louisiana, having 23 full time staff onsite within 5 days of emergency declaration. Within the first 3 weeks of response, CH2M had a peak of 71 staff supporting the program both locally and remotely. As part of the initial data information gathering, all 24 pump stations were visited to understand and develop operating concepts for major pump stations and power generation systems. Additionally, in collaboration with the SWBNO, CH2M provided historical systems documentation related to pump station layouts, previous reports, and rainfall information for City and SWBNO staff during rainfall events.

1.7.2 Tropical Storm/Hurricane Harvey Emergency Response Preparations (Completed)

During the Hurricane Harvey emergency response, CH2M mobilized 15 operators to monitor pump stations and underpass stations continually (24 hours/day, 7 days/week), in addition to providing continual coverage in Central Control to report drainage operations status using an internal GIS dashboard created by the SWBNO and City. At the request of SWBNO, teams from across the country worked 24/7 in advance of the storm, to model the anticipated rain event associated with Hurricane Harvey, and the potential flood response of the expected rainfall as an impact of the drainage system availability. Information was disseminated to the Mayor's office with reliable data on the drainage system response at then-current pump and power availability levels. Other activities included around-the-clock construction oversight (CO) on both temporary power, pump station repairs, and strategic temporary pump rentals at key drainage stations. CH2M worked in collaboration with SWBNO Senior Leadership, Operations, Facilities Engineering, Central Control, Procurement, and the City Mayor's staff to make sure requested needs were satisfactorily met.

Task 2 Emergency Pump Restoration Program

2.1 Emergency Drainage Pump Design Services (Task 03.02.01)

The CH2M drainage pump task force is composed of engineering design services, construction oversight, and engineering services during construction. Since the emergency declaration, the CH2M management, construction oversight, and inspection field teams assisted with the restoration and recommissioning of approximately 2.11 million gallons per minute (gpm) of drainage capacity through targeted project delivery. The resulting total of 4,701 cubic feet per second of regained pumping capacity led to a 10 percent increase to the overall drainage system pumping capacity. In addition to the emergency repairs managed by CH2M, the SWBNO requested that CH2M provide surveying services to aid in and expedite the design of five underpass stations' permanent electric diesel generators. To complete the services quickly, CH2M contracted with DBE firm Batture Surveying. All surveys were received and transmitted to SWBNO in 7 days.

While repairs were ongoing, field inspection teams conducted drainage pump station visits at the request of SWBNO, to assess overall system functionality through visual assessment and operator interviews. CH2M conducted rigorous walk downs of all drainage pump stations documenting all deficient, non-working, and near-failure items. CH2M transmitted its findings to the SWBNO under Technical Memorandum "Drainage System Components Repair List" dated October 11, 2017.

CH2M is committed to overseeing the remaining immediate repairs with an anticipated completion date of January 8, 2018.

2.1.1 Construction Oversight

The CO team included a construction manager, field engineers, and construction observers played an integral role in completing the current emergency drainage pump repairs. "Plan of the Day" meetings take place daily at 6:30 AM and 6:00 PM for "End of Day" meetings to plan in detail the upcoming activities of the day relative to the various contractor schedules. Once discussed, the field engineers and observers are deployed to various sites where repairs are taking place. This information exchange supports timely updates of progress relative to schedule, early troubleshooting, and quality assurance, as well as highlighting upcoming coordination activities with SWBNO or other stakeholders, again to preserve schedule and maximize quality.

The Construction Manager is responsible for coordinating with all SWBNO Contractors performing repairs. The coordination is not limited to repair activities but includes other coordination activities and interface points surround Contractor change order reviews, field questions and recommendations, invoicing reviews, and coordinating all field engineers or construction observers.

Each field engineer or construction observer captures progress photos documenting the repairs as they near completion. In addition to the progress photos, daily field reports detailing the activities completed, issues encountered if any, contractor questions, scope adherence, and confirmation that quality assurance are maintained.

During construction, the CO team provides qualified personnel to oversee the construction because the team has a thorough understanding of the bid package and the values associated with the bids. The CO team provides the following services:

- Track daily progress and document that progress or issues.
- Assure that work is being performed correctly and completely.
- Assess values for payment request.
- Interface with the contractor on an equal knowledge basis.
- Predict actual schedule.
- Understand the need for requested Change Orders (CO).

2.1.2 Closeout Activities

Once the repairs are near complete, the field engineer or construction observer is responsible to arrange and coordinate the commissioning and startup of the repaired/refurbished drainage pump with the attendance of the Contractor's staff, SWBNO Operations, and SWBNO Facility Maintenance. After satisfactory commissioning and startup of the equipment, the field engineer or construction observer completes the commission and startup checklist, and also documents operational turnover to SWBNO. This process documents the completion of the repairs and highlights any remaining punch list items that are required for the contractor to fully complete the task before project close-out and final invoicing.

Following the commissioning of the repaired/refurbished equipment, the field engineer with the oversight of the construction manager begins the closeout process. The closeout process essentially compiles the entire history of the repair from the bid phase through completion and commissioning.

The closeout package also includes a standard operating procedure (SOP) for safely operating and maintaining the repaired/refurbished equipment.

2.1.3 Services During Construction

Site visits are performed at each stormwater drainage pump station undergoing maintenance by contractors per the SWBNO.

The support services included responding to Contractors' Requests for Information (RFIs), drawing reviews, submittal reviews, and other technical services. Due to the lack of detailed drawings for all the drainage pump stations, and to facilitate future effective remote design work, the CH2M Design Engineering Team conducted comprehensive site visits, investigative tours, captured as-built conditions, obtained drone photographs and 360 virtual tours, and performed operator interviews.

2.1.4 Interactive System Reliability Modeling

An initial team of flood modeling subject matter experts commenced work on August 12, 2017, in preparation for supporting project evaluation and prioritization while the drainage assets were not at full operational capacity. CH2M received and reviewed HEC-RAS and SWMM models previously developed by SWBNO and the City's consultant, and communicated with the previous consultant to understand the background of the models and information provided. The team began running simulations to evaluate different rainfall scenarios to understand drainage system capacity and identify potential flooding related to predicted rain events based on current drainage system asset availability. Numerous technical requests were made, and are in progress to deliver to the Mayor and City staff, from the modeling team, including the following:

- Confirming actual drainage system capacity to-date (update 1 inch first hour and 0.5 inch every hour thereafter).

- Determining response of the system with levels of reduced pump and drainage basin effectiveness.
- Supporting, as future work, the prioritization of repairs of all out-of-service pump station equipment, assessing the impact of high capital expense critical repairs, and quantifying impacts of failure.

To improve upon previous modeling efforts, CH2M used the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Precipitation Frequency of the United States (Volume 9, Version 2; dated 2013) to develop rainfall profile distributions for the New Orleans area for a variety of total rainfall amounts, rainfall duration, and storm "shapes." This method replaces traditional stormwater modeling efforts based on historical Weather Bureau Technical Paper No. 40, dated 1961 and is a more robust approach to evaluating the response of the drainage system to rain events.

Using existing hydraulic model(s) provided by SWBNO, CH2M will continue to respond to specific modeling needs (such as predicted storm/rain events), as well as support the prioritization of identified repair needs and assess the impact of high-capital expense projects by quantifying the impacts of failure through census data (number of structures impacts) and flooding extents. Additionally, a criticality assessment will be performed by assessing the response of the drainage system to multiple rainfall profiles and system conditions/stressors. The impact of adding more pumping capacity to DPS 12 is also being evaluated to support design team efforts.

The accuracy of these tools and assessments will be limited by the quality and extent of information supplied by the SWBNO. CH2M will also use these tools to work with City staff in support of stormwater planning in progress by that organization.

2.2 Emergency Drainage Pump Design Support (Task 03.02.13)

The CH2M Design Engineering Team was initially tasked to augment the SWBNO Mechanical Engineering Department to provide support services relative to the ongoing emergency repairs under the emergency declaration of August 10, 2017.

In collaboration with the CH2M asset management team, strategic communication, and predictive modeling, the engineering team quantified and verified various system definitions to help the public better understand the drainage system and its limitations. CH2M prepared process flow diagrams in addition to other visual aids to better communicate the components of the subsystem, from a drainage pump station level to the overall drainage system that encompasses the City's drainage pump stations and components.

CH2M's commitment to an expedited response in support of the SWBNO and recognition of ongoing emergency conditions necessitated the need for the engineering team to be divided into four main groups. Each group addresses a specific system component yielding efficient design packages, developed by a team of subject matter experts (SMEs). The groups are Pump Repairs/Refurbishment, Discharge Bells, Isolation Gates and Valves, and Anti-Siphons, and the responsibility of each SME team is described as follows:

1. The Pump Repairs/Refurbishment team is responsible for preparing the construction documents necessary to replace the bearings, shaft, and lubrication lines on Pumps 4C/D/E, 12D, 6H. Additionally, the pump team is responsible for preparing procurement and construction documents for the replacement of constant duty pumps 1 and 2 at DPS 7. It is anticipated that this repair work will be completed during the 2017-2018 non-hurricane season. The team consists of mechanical, electrical, structural, and CAD personnel responsible for preparing drawings and specifications.
2. The Discharge Bell team is responsible for preparing the design documents necessary to replace the Discharge Bells at DPS 3, 5, and 7 as a priority. Design packages will be prepared for the work required at each station, but it is anticipated that the actual site construction work will commence after the 2017-2018 non-hurricane season. Depending on the site dewatering methodology and the permitting requirements, the schedule may be extended. Additionally, it is anticipated that fabrication of the new discharge bells may require a longer lead time than other traditional repairs. The Discharge Bell replacement project also includes inclusion of a new cathodic protection system. This team consists of structural, corrosion, and CAD personnel.

3. The Isolation Gates and Valves team is responsible for preparing the design documents necessary to replace the large butterfly-type isolation gates on the discharge side of DPS 3. These gates were originally fabricated with wooden planks on a steel frame. The gates and operators do not function as originally designed and will be replaced with new gates and operators. Due to the potentially complicated dewatering methodology, construction requirements, and fabrication lead times, it is anticipated that this task will not be completed during the 2017-2018 non-hurricane season. This team consists of mechanical, electrical, structural, and CAD personnel.
4. The Anti-Siphon team is responsible for preparing the design documents necessary to repair and/or replace the components associated with the pump priming/vacuum breaking system on the large horizontal drainage pumps at DPS 1, 4, 6, 5, 7, 12, 19, 11, and 13. This system helps prevent water from flowing from the discharge canal, through the pump cavity, back to the intake canal. It is anticipated that these components can be replaced in the 2017-2018 non-hurricane season. This team consists of mechanical, instrumentation and controls (I&C), and CAD personnel.

In addition to the technical SMEs assigned to each design team, the CH2M Design Engineering Services team includes discipline specific Professional Engineers (PEs) licensed in the State of Louisiana responsible for the overall review, approval, and final stamping of the design packages prior to delivery. The review team works closely with the discipline SMEs throughout the design process in accordance with the requirements of the Louisiana Professional Engineering and Land Surveying Board.

Table 1. Emergency Drainage Pump Scope of Work Project List

Amendment to Emergency Program Management and Staff Augmentation of Operations, Maintenance, and Recovery

				Engineering Design Packages						Procurement Packages			Construction Services	
Classification	Priority	Drainage Pump Stations	Brief Scope Description	Conceptual TM	Final TM	IFR Specs	IFR Drawings	IFC Specs	IFC Drawings	Construction Estimate	Bid Package	Bid Evaluation	R/Inspections & QA	Closeout Packages
Pump Repairs														
	1.A	DPS 4	*Replacement of bearings, shaft, oil lines on 4C/4D/4E*	☑	☑	☑	☑	☑	☑	☑				
	1.B	DPS 12	*Replacement of bearings, shaft, oil lines on 12D. Repair of concrete around discharge entrance to encasement*	☑						☑				
	1.C	DPS 6	*Replacement of bearings, shaft, oil lines on 6H*	☑						☑				
	1.D	DPS 5	*Replace CD 1 L and R*											
	1.E	DPS 7	*Replacement of constant duty pumps*	☑						☑				
Anti-Reverse Flow														
	1.A	DPS 1	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.B	DPS 4	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.C	DPS 6	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.D	DPS 5	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.E	DPS 7	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.F	DPS 12	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.G	DPS 19	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.H	DPS 11	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
	1.I	DPS 13	*Replacement of all butterfly valves and actuators for priming valve and vacuum break valve for all pumps*	☑	☑					☑				
Discharge Bells														
	1.A	DPS 7	*Replace Discharge Bells on 7A, 7C, and 7D*	☑	☑					☑				

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Amendment to Emergency Program Management and Staff Augmentation of Operations, Maintenance, and Recovery

				Engineering Design Packages						Procurement Packages			Construction Services	
Classification	Priority	Drainage Pump Stations	Brief Scope Description	Conceptual TM	Final TM	IFR Specs	IFR Drawings	IFC Specs	IFC Drawings	Construction Estimate	Bid Package	Bid Evaluation	R/Inspections & QA	Closeout Packages
	1.B	DPS 5	*Replace Discharge Bells on 5A and 5B. Replace sheet pile walls on vertical discharge*	☑	☑					☑				
	1.C	DPS 3	*Replace Discharge Bells on 3A, 3B, 3C, 3D, 3E*	☑	☑					☑				
Isolation Gates and Valves														
	1.A	DPS 3	*Replace all three wooden isolation gates, stems, and operators*	☑	☑				☑					
	1.B	DPS 1	*Replace stem and guides for one of the intake isolation gates*											
	1.C	DPS 4	*Install gate that is sitting on deck. Need to remove portion of nearby discharge pipe to get it done.*											
Miscellaneous														
	1	All DPS	*Test all overhead cranes, perform load tests, certify cranes for service, provide investigation report for cranes that fail*	☑	☑					☑				
	1	DPS 12	*Develop Conceptual Design for converting entire station to 60 hz and add additional pumps to increase capacity*	☑						☑				

☑ Scope Included in this proposal

IFR – Issued for Review

IFC – Issued for Construction

Task 3 Emergency Power Program

3.1 Temporary Generator Implementation (Task 03.03.00 CLOSED – costs to be transferred to EMDs)

To provide temporary backup power to frequency changers at Pump Station D and Carrollton Frequency Changer, 18, 2.0 megawatt (MW) diesel-powered generators were installed by two subconsultants. CH2M provided quality assurance/quality control (QA/QC) of installation and wiring of these assets, coordinated with additional third party QA/QC (USACE), and assisted in the development of a power switching plan in conjunction with Central Control. CH2M also coordinated the fueling activities for these generators with the SWBNO Contractor. The power team also assisted in the location, sizing, and connection of 60 Hz generators at multiple drainage pumping stations that previously did not have backup power.

The temporary generators at the Station D and CFC provide 20.5 MW of power, increasing the reliability of this asset (currently over 50 percent of available system wide 25 Hz power is backed up).

A task for temporary generator implementation and demobilization (Task 3.2) was included in the original CH2M contract, which included the activities described in this section. Currently, it is understood that these specific needs are no longer required; therefore, no further scope is included for this task.

3.2 Demobilize Temporary Generators (Cancelled – costs to be transferred to EMDs)

A task for Demobilize Temporary Generators was proposed in the first contract submittal. Currently, it is understood that this task is no longer required; therefore, no further scope is included for this task.

3.3 Electro-Motive Diesel Generator Installation (Task 03.03.01)

As part of the emergency actions, SWBNO contracted for delivery of five EMD generators. Each EMD is a 2.5 MW generator with capability of producing 25-hertz power.

CH2M supported the process of procuring EMDs by facilitating discussion with the EMD vendor, City officials, SWBNO Engineering, Operations, Maintenance and Central Control to address and resolve several design concerns. CH2M has been key in bridging the Contractors and SWBNO engineering personnel with their expertise and commitment to quality. The Power task force, including subcontractors, has coordinated with multiple contractors in the off-loading, layout, and installation of the EMDs. Additionally, CH2M has addressed multiple unexpected events such as delayed or erroneous technical information provided by the vendor, damaged equipment provided by the vendor, vendor logistics delays and errors, change in scope from temporary to semi-permanent installation, unstable soils and gas leaks.

The EMD support currently includes continued construction management, QA/QC of electrical connections, startup assistance, contactor coordination and monitoring for quality on time work and effort, ensuring the equipment provided meets codes, and documenting the contract closeout.

CH2M has been coordinating design and installation of laydown area elements, electrical connections, fuel farm, piping and connections and other considerations for installing and running the EMDs as a part of the SWBNO electrical system. The installation of the EMDs has become a critical and increasingly higher priority due to other delayed components of the SWBNO power generation schedule. CH2M will continue to integrate the delivery, installation, connection, startup and operator training for the EMDs. CH2M will develop a testing and startup integration plan for the EMDs. This plan will provide the connection, testing, startup and commissioning based on SWBNO's priority of using a combination of the available EMDs.

CH2M will provide support for the startup and commissioning of the EMD units, and prepare an ongoing historical record of events and commissioning & startup punch-list for use by the SWBNO.

Scope considered with this estimate includes as-known scope as of December 1, 2017 which considers EMD start-up and synchronization to the SWBNO 25Hz grid to occur on or before December 22, 2017 for all five EMD units,

followed by a 3-week off-site close-out period. This scope does not the development of standard operating procedures (SOPs) as originally proposed, include a full-time safety officer, security personnel or associated equipment. This scope and fee estimate associated with this work does not consider additional items under discussion that have arisen after this date.

3.4 T6 60 Hz Outdoor Switchgear Assessment (Task 03.03.03 CANCELLED – costs to be transferred to EMDs)

A task for 60 Hz Outdoor Switchgear Assessment was proposed in an earlier amendment submittal. Currently, it is understood that this task is no longer required; therefore, no further scope or fee is included for this task.

3.5 Power Alternatives Study (Task 03.03.04)

The CH2M power team coordinated and developed a Power Study for the SWBNO that seeks to define the future condition of the power needed to establish reliable and cost-effective power to operate the drainage stations. A workshop was conducted September 12, 2017, with senior SWBNO and Mayor's office staff to characterize four previously identified holistic options for providing permanent power for the SWBNO system, determine criteria for assessing these options, and set key considerations for each option.

As a follow-on activity, CH2M provided a review and assessment of these four options with one hybrid option. The power study included historical literature reviews by SMEs and detailed criteria assessments with SMEs. Four workshops were organized and led by CH2M to better understand SWBNO expectations and preferences for the future of power generation. CH2M provided an analysis of all five options evaluated by the assessment criteria, as requested. The criteria and their weighting factors included: increasing reliability (40 percent), using committed capital (5 percent), reducing OPEX costs (15 percent), reducing greenhouse gases (10 percent), extended life span (10 percent), and 20-year cost benefit (20 percent).

A draft summary presentation was delivered on October 18, 2017. CH2M will incorporate comments received and provide a technical memorandum summarizing the pre-feasibility level assessment. Per direction of the City of New Orleans Capital Planning Department received on November 17, 2017, CH2M will cease all feasibility study (next phase) work previously endorsed by the Mayor's office to refine the will cease will continue to refine the estimates of Options 3 (full 60 Hz Decentralized Conversion) and highest potential power alternatives, and will provide the following deliverable for December 20, 2017:

- Final summary of power alternatives options in PowerPoint format with intended audience as the SWBNO Board of Directors
- Options (including +50/-100% level cost and schedule) to expend remaining Power Plant Retrofit HMGP funds in alignment with top two power alternatives options

3.6 Permanent Generator Backup at Pump Station D (Task 03.03.05 CANCELLED)

A task for Permanent Generator Backup at Pump Station D was proposed in an earlier amendment submittal. Currently, it is understood that this task is no longer required; therefore, no further scope or fee is included for this task.

ATTACHMENT A

Amendment 2 to the Professional Services Agreement Sewerage and Water Board of New Orleans

And

CH2M HILL Engineers, Inc.

For

Emergency Program Management and Staff Augmentation of Operations Maintenance and Recovery

This Amendment 2 is to the Professional Services Agreement dated August 23, 2017, between the Sewerage and Water Board of New Orleans (SWBNO) and CH2M HILL Engineers, Inc. (CH2M). The Scope of Work (SOW) is focused on those actions identified by SWBNO as remaining priority actions.

Scope of Work

Task 1 Electro-Motive Diesel (EMD) Generators

1.1 Environmental Support

Environmental Consulting

The scope of this contract is to provide services requested by SWBNO for air permitting compliance, continued emissions support, and Spill Prevention Control and Countermeasure Plan (SPCC) support. This scope includes 8 hours per week for general consulting services for an environmental engineer. It also includes up to 2 hours per week for an environmental senior technical consultant.

Estimated costs are based on an end of services estimated date of June 15, 2018.

1.2 EMD Support

EMD 1 Repair (Task 01.02.01)

Coordinate, oversee and document the commissioning, load testing, phase testing, synchronization check and integration into the SWBNO ring buss. Provide project management, construction support, quality control and administrative oversight for EMD 1 repair. Provide administrative support for the processing of invoices. Review testing documentation to help determine the best path forward to meet SWBNO objectives.

Standard Operating Procedures (SOPs) and Preventative Maintenance Plan (Task 01.02.02)

Subtask 01.02.02a Standard Operating Procedures: The EMDs require standard operating procedures for safe and reliable long-term operation, and are to be provided as part of close-out and turnover of the EMDs to the SWBNO. These will be provided as part of the closeout and commencement of SWBNO operations of the EMDs.

Subtask 01.02.02b Preventative Maintenance Plan (Including Inspections and Implementation of OPM database): The scope of this contract is needed to provide the SWBNO with the current status of the aspects of their power

the optimum approach. Oversee construction and provide quality control supervision throughout the execution of the full scope of work. Supervise the engineering contractor and provide engineering QA services.

~~EMD Operations & Maintenance Services (setup and coordination)~~ Removed From Scope

~~Establish initial scope of work, provide project controls support for the scope, and provide project management and administrative support to establish the contract and the processing of invoices. Perform independent cost estimate (ICE) and determine the optimum approach.~~

EMD Slab Settlement Monitoring (Task 01.02.10)

The scope of this work is to provide the ongoing horizontal and vertical monitoring of five (5) EMD Slabs, five (5) Day Tank Slabs, five (5) fuel tank skids, and two (2) NGR slabs. Establish initial scope of work, provide project controls support for the scope, and provide project management and administrative support to establish the contract and the processing of invoices. Perform independent cost estimate (ICE) and determine the optimum approach.

E-Stops for the EMDs (Task 01.02.11)

The scope of this contract is needed to provide a single location for emergency shutdown of the 480V power to the EMDs which results in a full shutdown of each EMD unit. Establish initial scope of work and provide project controls support for the scope. Provide project management and administrative support to establish the contract and the processing of invoices. Perform independent cost estimate (ICE) and determine the optimum approach. Oversee construction and provide quality control supervision throughout the execution of the full scope of work. Supervise the engineering contractor and provide engineering QA services.

Lightning Protection System (Task 01.02.12)

Establish initial scope of work, provide project controls support for the scope, and provide project management and administrative support to establish the contract and the processing of invoices. Perform independent cost estimate (ICE) and determine the optimum approach. Oversee construction and provide quality control supervision throughout the execution of the full scope of work. Supervise the engineering contractor and provide engineering QA services.

Estimated costs of EMD are based on an end of services estimated date of June 30, 2018.

Task 2 Emergency Pump Restoration

2.1 Anti-siphon for DPS 1 and DPS 4-Bidding Services and Construction Administration

The DPS 1 Anti-Siphon Project design documents were Issued For Construction (IFC) to the SWBNO on December 8, 2017. The DPS 4 Anti-Siphon Project design documents were Issued For Construction (IFC) to the SWBNO on December 15, 2017. The project is moving forward through procurement and is expected to begin construction in a few months. The proposed work includes the following work elements:

Bidding Services, assumed ~3 months per DPS (Task 02.01.01):

- Coordination and Pre-Bid Meeting
- Response to Bidder Questions
- Preparation of Bid Addendums
- Bid Evaluation and Recommendation

Construction Administration, assumed ~3 months per DPS (Task 02.01.02):

- Engineering Services During Construction (RFI/Submittal Review, etc.)

- Construction Oversight
    - Daily progress report including photographs, coordination with contractor and SWBNO departments (Facilities, Operations and Engineering), reviewing project schedules, RFIs and FCOs prior to approval and providing recommendations, facilitating progress meetings, holding contractor accountable to specifications within IFC set by highlighting deviations to SWBNO.
- Closeout

2.2 DPS4 Pump Repair Project-Bidding Services and Construction Administration

The DPS 4 C/D/E Pump Repair Project design documents were issued For Construction (IFC) to the SWBNO on December 8, 2017. The project is moving forward through procurement and is expected to begin construction in a few months. The proposed work includes the following work elements:

Bidding Services, assumed ~3 months (Task 02.01.03):

- Coordination and Pre-Bid Meeting
- Response to Bidder Questions
- Preparation of Bid Addendums
- Bid Evaluation and Recommendation

Construction Administration, assumed ~3 months (Task 02.01.04):

- Engineering Services During Construction (RFI/Submittal Review, etc.)
- Construction Oversight
    - Daily progress report including photographs, coordination with contractor and SWBNO departments (Facilities, Operations and Engineering), reviewing project schedules, RFIs and FCOs prior to approval and providing recommendations, facilitating progress meetings, holding contractor accountable to specifications within IFC set by highlighting deviations to SWBNO.
- Closeout

Estimated costs for Task 2 are based on an end of services estimated date of October 31, 2018.

Task 3 Communications Support

From August 11, 2017 through November 30, 2017, the team prepared and disseminated status reports for power and pumping assets twice daily, including temporary generators, as well as the status of multiple critical pump station repairs. Currently these reports are modified, updated, and verified upon request as new assets become available or as new information is received. Anticipated services include dashboard visibility from Central Control during rain events as requested, ~~supporting the development of public facing information on SWBNO drainage and power assets, and continued reporting of pump and power status.~~

~~3.1 City of New Orleans Communications Reporting & Operations Status~~

Removed from Scope

~~The team will review press releases and other information and data reqeusts with operational status information at the request of SWBNO and the City of New Orleans (City), and provided comment on accuracy and completeness of information, as well as respond to FOIA requests as required up to 7 requests. CH2M will continue to provide detailed Powerpoint slide decks up to once monthly to support meetings conducted by SWBNO. The online operations dashboard that was created during Immediate Recovery Support activities as an improvement to the original spreadsheet based version. Continuing services include distribution of operational~~

~~status reports via email and online dashboard, responding to supplemental information requests from the SWBNO and interim management team, and facilitating information distribution internally.~~

3.2 Rain Event Visibility

Rain Event Visibility (Task 03.01.01): An online pump status dashboard was created during Immediate Recovery Support activities to provide visibility of the pumps that are operating during a rain event. Continuing services include updating the pump status dashboard during rain events upon request from SWBNO, as well as compiling notes and responding to information requests. This task will include up to 40 events of 12 hours each.

Estimated costs for Task 3 are based on an end of services estimated date of October 31, 2018.

Task 4 Project Services Support

4.1 Project Services (Task04.01.01)

CH2M program services including project controls, estimating, and document controls will continue to maintain the project framework established during the earlier phases of this project. This framework feeds the change management, invoicing, weekly schedule, progress and earned value updates, and cost tracking used in the monthly reporting and program portal.

A CH2M Program Controls Manager and other staff working on a part-time basis as necessary to support the identified delivery scope will maintain the framework to provide insight regarding cost, schedule, and procurement services. Elements of the Program Controls system are anticipated to include schedule controls, document controls and change management, and procurement and contractor invoicing controls. Project close-out activities are included as project reach their completion.

CH2M will continue to provide project management, project controls including scheduling, engineering design services, quality assurance, and coordination in the capacities as defined in the original agreement for the additional assigned Pump Station and Permanent Power Scope as outlined in this proposal.

CH2M has developed a master schedule that integrates ongoing emergency operation activities. The master schedule will include CH2M Level 3 design activity schedules updated weekly, and contractor Level 1 schedules updated monthly for the purpose of managing the delivery and cashflow projections.

Estimated costs for Task 4 are based on an end of services estimated date of August 31, 2018.

Task 5 Program Management

5.1 Program Management and Support (Task05.01.01)

Program management and support services are intended to provide a framework for project delivery, financial oversight and accountability, administration, performance reporting and strategic delivery and resource planning.

CH2M will continue to assist in preparation of draft procurement documents, technical analysis, and design support for specific project development and construction contract project management. This includes identification of necessary SWBNO staff action items in support of the CH2M program and project management activities.

CH2M will continue to use internal systems to provide program document control and contract management for in-progress documentation.

Estimated costs for Task 5 are based on an end of services estimated date of August 31, 2018.